

accord generally with the views propounded long since by Bernoulli. The relations which the author points out between the height of high-water and the atmospheric pressure as indicated by the barometer are particularly interesting and important. The influence of the wind is also considered; and such corrections indicated as are requisite in consequence of the employment by several observers of solar instead of mean time.

3. "Discussion of the Magnetical Observations made by Captain Back, R.N., during his late Arctic Expedition." By Samuel Hunter Christie, Esq., M.A., F.R.S. Part II.

The author proceeds, in this paper, which is a sequel to his former communication, to discuss the observations made by Captain Back relating to the magnetic intensity, and which were of two kinds; the first, obtained by noting the times of vibration of a needle in the plane of the magnetic meridian; the second, by noting the times of vibration of three needles suspended horizontally according to the method of Hansteen. The results are given in the form of tables.

Before deducing results from these observations, the author describes a series of experiments instituted with each needle, for the purpose of determining the corrections necessary to be applied in order to reduce the intensities, which would result from observations made at different temperatures, to intensities at a standard temperature; and he gives formulæ for these corrections. He then determines the relative terrestrial magnetic intensities, at the several stations where observations were made, from the times of vibration of the dipping needle in the plane of the meridian, applying the corrections which he had obtained for difference of temperature; and gives the results in tables. A comparison is instituted between these results and a formula derived from the hypothesis of two magnetic poles not far removed from the centre of the earth. The author considers that this comparison is quite conclusive against the correctness of the formulæ, and consequently of the hypothesis itself, if applied to the results deduced from the observations in London, in conjunction with those in America; but that, in the tract of country comprised by Capt. Back's observations from New York to the Arctic Sea, the phenomena of terrestrial magnetic intensity are very correctly represented by the formula in question.

The author then proceeds to determine the intensity from the observations with horizontal needles, applying here, likewise, to the results, corrections for the difference in the temperatures at which the observations were made. In these results there are great discrepancies, which the author attributes to the inapplicability of Hansteen's method of determining the intensity by the times of vibration of horizontal needles to cases where the dip of the needle is very great, rather than to errors in the observations themselves, or to a variation in the magnetism of the needles employed. He concludes by a just tribute to the zeal which Captain Back has manifested in the cause of science, by availing himself of every opportunity of making these tedious observations, during an unknown and perilous navigation.